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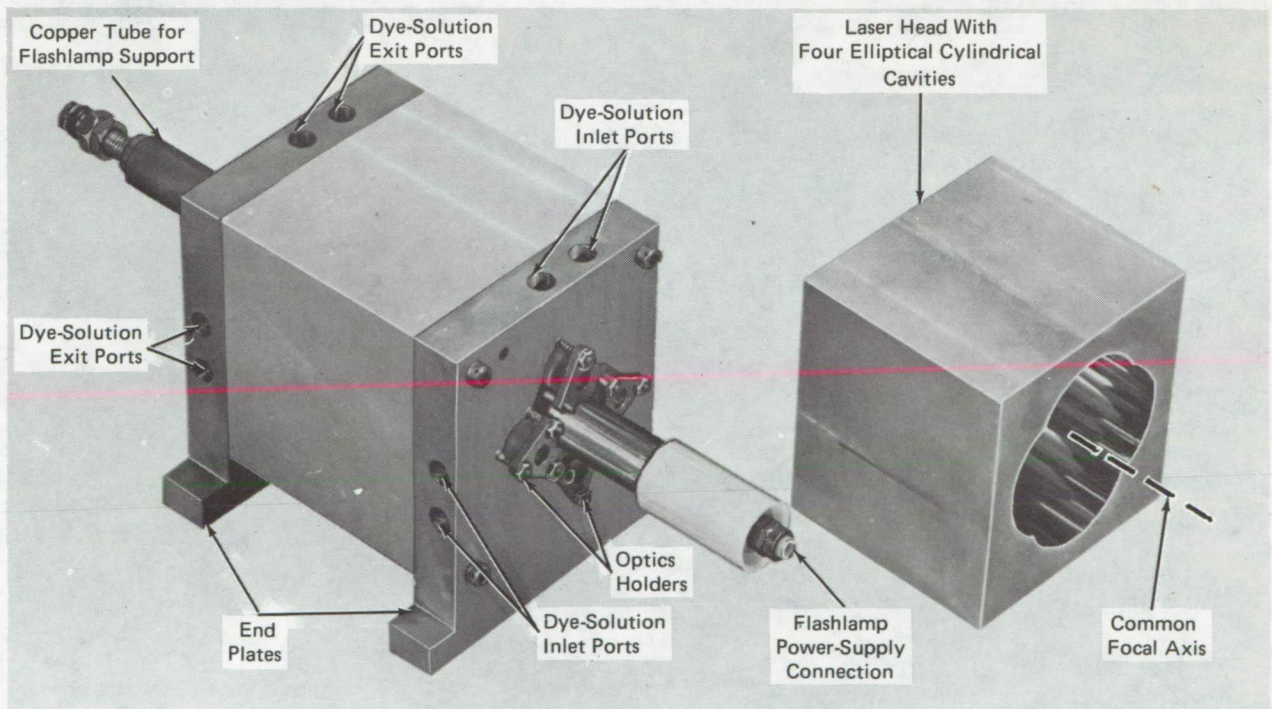
A Laser Head for Simultaneous Optical Pumping of Several Dye Lasers

A multielliptical-cavity laser head has been developed which provides simultaneous optical pumping of several dye lasers in a compact, efficient, and reliable manner. This device accomplishes such optical pumping using a single flashlamp and an electrical driver. This is possible because dye lasers require relatively low energy to operate (low-threshold pumping requirement) and provide a new simple method for producing simultaneous independent laser output at a number of different wavelengths.

In this design (see illustration), the lamp is placed on the common focal axis, and the dye cells occupy the four remaining focal axes. The dye cells share the radiation output of the lamp equally.

This laser head consists of a number of elliptical cylinders with a common focal axis and the remaining axes equally spaced about it. The number of cylinders used can range from one to more than eight, depending on the number of laser systems to be pumped, the available flashlamp energy, and the dye-laser medium used.

The multielliptical cylinder cavity can be machined from a single block or made in sections and assembled. The cavity must be polished for maximum uniform reflectivity. The dye cells and the lamp are held in place by stainless steel end plates, which hold mirrors for each laser cavity, permit dye solution to flow through the cells, and reflect light from polished surfaces to increase



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(continued overleaf)

pumping efficiency. Stainless steel is used as it is non-reactive to solvents used with the dyes. Copper tubes, mounted on the end plates, act mechanically to support the flashlamp and complete the electrical circuit as ground return. Optics holders, also mounted on the end plates, are used to support and adjust the laser mirrors. Windows are used instead of mirrors, if externally mounted mirrors are required. A standard capacitive electrical driver system is used to supply electrical energy to the flashlamp. The lamp used in this device is water cooled and rated at 100 joules input.

Note:

Requests for further information, including the lidar flight package used for dye-laser remote sensing of marine plankton, may be directed to:

Technology Utilization Officer
Langley Research Center
Mail Stop 139-A
Hampton, Virginia 23665
Reference: B73-10336

Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

Patent Counsel
Langley Research Center
Code 456
Hampton, Virginia 23665

Source: Peter B. Mumola and
Belton T. McAlexander
Langley Research Center
(LAR-11341)